

## Research article

# Psychological defense mechanisms among individuals with SCI with adjustment disorder

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**Objectives:** The used psychological defense styles among individuals with spinal cord injury (SCI) with adjustment disorders (AJD) have not yet been described. In the present investigation, the prevalence of AJD among people with SCI has been estimated and the pattern of used defense styles has been identified.

**Design:** Cross-sectional investigation.

**Setting:** A tertiary rehabilitation center in Iran.

**Participants:** Individuals referred to Brain and Spinal Cord Injury Research Center were invited to participate in a screening interview. AJD was diagnosed based on DSM-V criteria. Those with AJD diagnosis were scheduled for another interview to assess defense mechanisms.

**Outcome measures:** Demographic and injury-related variables were recorded. Defense mechanisms were assessed by the 40-item version of the Defense-Style Questionnaire (DSQ-40).

**Results:** Among 114 participants, 32 (28%) were diagnosed with AJD among whom 23 subjects attended the second interview. Mean age and time since injury were  $29.57 \pm 9.29$  years and  $11.70 \pm 6.34$  months, respectively. The majority of patients were using idealization defense mechanism (91.3%). In the second and third place, passive aggression (87.0%) and somatization (82.6%) defense mechanisms were observed, respectively. Neurotic style was dominantly used ( $11.52 \pm 2.26$ ). Sex, marital status, educational level, cause of the injury and injury level were not related to defense style ( $P: 0.38, 0.69, 0.88, 0.73$ , and  $P: 0.32$ , respectively).

**Conclusion:** Prevalence of AJD is estimated to be 28% among individuals with SCI. The most prevalent defense style was neurotic and the dominant used defense mechanism was "idealization." The role of demographic and injury-related variables in determining the used defense mechanisms was insignificant.

**Keywords:** Adjustment disorders, Defense mechanisms, Spinal cord injury

## Introduction

Psychological defense mechanisms are powerful unconscious coping techniques that reduce anxiety after a catastrophic event.<sup>1,2</sup> These mechanisms are psychological strategies to manipulate, deny, or distort reality in order to defend against overwhelming impulses to increase coping capability.<sup>3</sup> However, these mechanisms may

also have unhealthy consequences. In this regard, Vaillant<sup>4</sup> categorized defense mechanisms into four levels of pathological (psychotic denial, delusional projection), immature (fantasy, projection, passive aggression, acting out), neurotic (intellectualization, reaction formation, dissociation, displacement, repression) and mature defenses (humor, sublimation, suppression, altruism, anticipation). However, the most accepted defense mechanisms that are commonly used are summarized within three styles of immature, mature and neurotic.

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Spinal cord injury (SCI) is a disastrous event that imposes a tremendous burden of psychological disturbance. Coping strategies and psychological adjustment is an important issue in the rehabilitation process in SCI. Psychological adjustment is influenced by many factors. For instance, it has been shown by Kennedy *et al.*<sup>5</sup> that hope and cognitive appraisal are correlated with the coping strategy. Moreover, coping strategies have been shown to be related to functional outcomes.<sup>6</sup> Therefore, identification of the coping strategies that are used by people with SCI is clinically important in rehabilitation in order to plan therapeutic interventions for those using negative coping styles.<sup>6</sup> Since SCI is a catastrophic event, it is expected to observe psychological defense mechanisms among affected individuals.<sup>7</sup> However, it has been shown that many people with SCI are able to manage the consequences of disability without significant levels of psychopathology.<sup>8</sup> These defenses contribute to removal of components of uncomfortable affects from conscious awareness.<sup>9</sup> Thus, the process of psychological therapies in people with SCI is dependent to identification of these defense mechanisms. In this regard, Livneh and Martz<sup>10</sup> have reported that 2-dimensional structures of adaptation can be observed among people with SCI. One dimension indicates adaptive versus nonadaptive reactions and the other dimension shows denial versus realization of the impairments caused by SCI. The findings of Livneh and Martz's study are suggestive that the adaptation and adjustment to SCI is a complex process. Furthermore, identification of these defenses can be more complicated by co-existence of adjustment disorder. Adjustment disorders (AJD) are characterized as temporally maladaptation to identifiable stressors according to Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) definition.<sup>11</sup> AJD usually interferes with social functioning<sup>12</sup> and it has been demonstrated that AJD may develop into major depression when the stressor is persistent or affected individuals are unable to apply coping strategies.<sup>13</sup> Although adjustment disorders impair the integrity of individuals occupational functioning, it is considered to be a minor diagnosis.<sup>14,15</sup> However, the high prevalence of AJD among hospital inpatients (over 20%)<sup>16</sup> and adults outpatients (5–20%),<sup>17</sup> insists on the importance of further investigations on AJD.

According to DSM-IV,<sup>11</sup> there are six types of adjustment disorders, which are characterized by the following predominant symptoms: depressed mood, anxiety, mixed depression and anxiety, disturbance of conduct, mixed disturbance of emotions and conduct, and unspecified. One limitation for this diagnostic measurement

is that AJD can only be diagnosed in the absence of other psychopathological diseases based on DSM IV. In this regard, Maercker *et al.*<sup>18</sup> proposed a diagnostic model in which AJD is a stress response syndrome, such as posttraumatic stress disorder (PTSD). The discriminating variable was the difference in magnitude of the stress. Since stressor in PTSD is mostly life-threatening whereas ADJ is triggered by stressor with lower intensity such as family or work-related problems.<sup>18,19</sup> However, according to new edition of DSM-V, AJD is considered as "other specified trauma and stress-related disorder."<sup>20</sup>

Psychological defense mechanisms play an important role in the process of adaptation after SCI. In this regard, Fukunishi *et al.*<sup>21</sup> demonstrated that psychological acceptance can be achieved by suppressing or denying feelings during adaptation process after SCI. Craig *et al.*<sup>22</sup> showed that people with SCI may use different defense style as they perceive their life to be externally controlled along with having low self-esteem and feeling more helplessness and hopelessness. Although Hancock *et al.* demonstrated that the majority of patients with SCI reflect adaptive coping style,<sup>23</sup> still the substantial proportion of individuals displaying the maladaptive coping styles is noticeable. Therefore, assessment of psychological defense mechanism in people with SCI is clinically important to perform preventive interventions among susceptible subjects to maladaptive coping behaviors.

Up to now, no study has revealed the prevalence of adjustment disorders among Iranian individuals with SCI. Furthermore, psychological defense mechanisms are poorly described in this population. In the present study, defense mechanisms among Iranian individuals with SCI with adjustment disorders have been discussed.

## Patients and methods

### Study design and participants

This observational cross-sectional investigation has been designed in two separate phases. At the first phase, individuals with SCI who were referred to Brain and Spinal Cord Injury Research Center between June 2014 and June 2015 were invited to participate in this study. The major inclusion criteria were: post injury duration between three months and two years, age >18 years old, traumatic SCI. Patients were excluded according to the following criteria: previous history of mental and psychiatric disorders, co-existence of other chronic diseases including diabetes, hypothyroidism, hyperthyroidism, liver dysfunction, renal failure, history of heart and vascular disorders, immunosuppression due to AIDS or congenital immune diseases, rheumatoid

diseases, malnutrition, cancer, pulmonary diseases and etc. Those participants who were currently under treatment with glucocorticoids, thyroid hormones, immunosuppressive agents, chemotherapy, anti-depressants and anti-psychotic agents were also excluded. Those patients with habit history of smoking, alcoholism and drug abuse were excluded as well. Written informed consent was obtained from each individual before enrollment. Eligible participants were interviewed by an expert psychiatrist to screen for AJD. Those with diagnosis of AJD were scheduled for another interview to assess defense mechanisms. Since many patients with SCI come to our research referral center in Tehran from distant provinces of Iran, we tried to schedule the second interview as soon as possible for patients from other provinces. For the patients from other provinces, second interview was scheduled within 2–3 days and for those individuals living in Tehran, second interview was scheduled within 1–2 weeks. Another written consent was obtained from each individual after explanation of adequate information about the study. The second interview was done by an expert psychologist. The Protocol of the study was approved by ethics committee of Tehran University of Medical Sciences.

### *Screening for adjustment disorders*

In the present study, we used DSM-V checklist to screen adjustment disorder. According to DSM-V,<sup>20</sup> AJD is diagnosed based on the following criteria: “Development of clinically significant emotional or behavioral symptoms in response to identifiable psychosocial stressors. Symptoms must develop within three months after the onset of the stressor. These symptoms or behaviors are clinically significant and cause impairments in social, occupational, or academic functions due to marked distress. The stress-related disturbance does not meet the criteria for another specific Axis I disorder, and is not merely an exacerbation of a preexisting Axis I or Axis II disorder. The symptoms do not represent Bereavement. Once the stressor (or its consequences) has terminated, the symptoms do not persist for more than an additional 6 months.”

According to Patra and Sarkar<sup>24</sup>, this disorder is not included in widely used psychiatric diagnostic instruments like Mini International Neuropsychiatric Interview (MINI) and Composite International Diagnostic Interview (CIDI). Moreover, Jäger *et al.*<sup>25</sup> reported that there is a dramatic divergence between the clinical diagnosis and ICD-10 criteria that challenges the validity and usefulness of ICD-10. According to these evidences it seems that DSM-V

checklist is currently the most reliable tool to screen adjustment disorder.

### *Assessment of psychological defense mechanisms*

Defense mechanisms were assessed by the 40-item version of the Defense Style Questionnaire (DSQ-40) which was developed by Andrews *et al.*<sup>26</sup> in 1993. This self-report measure is the most frequently used questionnaire to identify defense mechanisms. This instrument has been widely validated in numerous languages.<sup>27–30</sup> This assessment tool has been shown to be reliable and valid for identification of defense mechanisms.<sup>31</sup> Moreover, The Farsi version of this instrument has been shown to have acceptable validity and reliability.<sup>32</sup>

This questionnaire consists of 40 items that has the capability to detect twenty defense mechanisms. Two statements are devoted to each defense, and each statement is rated on a scale from 1 to 9 (1 is indicative of complete disagreement and 9 shows complete agreement. This instrument evaluates twenty defense mechanisms in three main domains as follows: Mature (sublimation, humor, anticipation, and suppression), Neurotic (undoing, pseudo-altruism, Idealization, Reaction formation), Immature (projection, passive aggression, acting out, isolation, devaluation, autistic fantasy, denial, displacement, dissociation, splitting, rationalization, somatization). Defense mechanisms with summed scores of both related statements  $\geq 10$  were considered to have been used by participants.<sup>26</sup>

### *Demographic characteristics*

Participants' age, sex, time since injury, marital status, age at the time of occurrence of injury, cause of injury, educational level, employment, coincidental of head injury, and existence of suicide ideation were asked from each individual directly and were recorded in designed forms. Among those patients who had history of coma after SCI, time since injury was defined as the time interval three months after consciousness till the present time.

### *Neurological assessment*

Injury level was determined by clinical examination that was performed by an expert neurosurgeon and was confirmed by magnetic resonance imaging of the spinal cord. Classification of participants according to American Spinal Cord Injury Association (ASIA) Impairment Scale was as follows: ASIA-A indicates complete injury with no preserved motor or sensory function below the neurological level. ASIA-B describes incomplete injury in which only sensory function is

preserved below the neurological level. ASIA-C illustrates preserved motor function in which more than half of key muscles below the neurological level have a muscle grade <3. ASIA-D indicates preserved motor function in which at least half of key muscles below the neurological level have a muscle grade of 3 or more.<sup>33,34</sup> Spinal cord independence measure III (SCIM) was used to evaluate patients' independency and ability in performing daily tasks.<sup>35</sup> This instrument contains three subscales: self-care (0–20), mobility (0–40 scores) and respiration and sphincter management (0–40 scores), which comes to a maximum score of 100. Higher scores illustrate more independency.<sup>35</sup>

### Statistical analysis

Continuous variables were described by mean  $\pm$  standard deviation. Frequency and percentages were used to describe categorical variables. The comparison of

categorical variables between different demographic groups was performed using  $\chi^2$  test. T-test was used to compare means between groups and bivariate correlation analysis was used to assess the relationship between continuous variables. All statistical analysis was performed using SPSS software version 21 (IBM Corp, Armonk, NY, USA).

### Results

Total of 116 patients were invited to participate in the first phase of the study and among whom, two patients did not consent to participate. The remained 114 individuals with SCI participated in the first study phase. After interviews, adjustment disorder was diagnosed in 32 patients (28%) according to DSM-V criteria. Individuals with AJD were invited to participate in the next phase of the study and were scheduled for another interview. Twenty-three patients attended the

**Table 1** Baseline and injury-related variables among participants with SCI with adjustment disorder

Category		Mean (SD)	Frequency (percentage)
Sex	Male	-	18 (78.3)
	Female	-	5 (21.7)
Age (years)		29.57 (9.29)	-
Marital status	Single	-	11 (47.8)
	Married	-	7 (30.4)
	Widow/widower	-	1 (4.4)
	Divorced before injury	-	2 (8.7)
	Divorced after injury	-	2 (8.7)
		-	2 (8.7)
Cause of Injury	Road accidents	-	17 (73.9)
	Falling	-	4 (17.4)
	Crash under heavy objects	-	2 (8.7)
Time since injury (months)		11.70 (6.34)	-
Coincidental head injury	Yes	-	10 (43.5)
	No	-	13 (56.5)
Level of injury	Cervical	-	10 (43.5)
	Thoracic	-	10 (43.5)
	Lumbar	-	3 (13.0)
		-	3 (13.0)
Educational level	Primary school	-	2 (8.7)
	Middle school	-	4 (17.4)
	High school	-	3 (13.0)
	Diploma	-	10 (43.5)
	Academic educations	-	4 (17.4)
Age at the time of injury incidence (years)		28.57 (9.15)	-
SCIM score		33.0 (19.8)	-
ASIA score	A	-	9 (39.1)
	B	-	8 (34.8)
	C	-	5 (21.7)
	D	-	1 (4.3)
		-	6 (26.1)
Suicidal ideation	Yes	-	6 (26.1)
	No	-	17 (73.9)
Financial Satisfaction	Totally satisfied	-	7 (30.4)
	Relatively satisfied	-	15 (65.2)
	Dissatisfied	-	1 (4.3)
Movement aids	Wheelchair	-	20 (87.0)
	Walker	-	2 (8.7)
	Cane	-	1 (4.3)
Satisfaction with interpersonal relationships	Totally satisfied	-	12 (52.2)
	Relatively satisfied	-	9 (39.1)
	Dissatisfied	-	1 (4.3)

second interview (n: 18, 78.3%) men and n: 5, 21.7% women). All the patients who attended the second interview (n: 23) consented to the participation in the study. Demographic and injury-related variables in subjects who did not attend the second interview were not significantly different from those who consented to participate. Mean age and mean time since injury were  $29.57 \pm 9.29$  years and  $11.70 \pm 6.34$  months, respectively. Mean age at the time of incidence of injury was  $28.57 \pm 9.15$ . The highest proportions of participants were single (n: 11, 47.8%). Seven participants were currently married (n: 7, 30.4%). Two participants were divorced before injury incidence and two got divorce after occurrence of injury (n: 2, 8.7%). The most common cause of injury was road accidents (n: 17, 73.9%). Coincidental head injury was detected in 10 patients (43.5%). The majority of participants were wheelchair users (n: 20, 87.0%). Fifteen individuals were relatively satisfied with their financial status and dissatisfaction was observed only in one patient. Table 1 summarizes the baseline characteristics and injury-related variables among participants. The majority of individuals (n: 9, 39.1%) had complete injury (ASIA A). ASIA-B and C was detected in 8 (34.8%) and 5 (21.7%) patients, respectively. Mean SCIM score was  $33 \pm 19.8$ . Suicidal

ideation was mentioned by six (26.1%) participants (Table 1).

Table 2 illustrated the mean score of each defense mechanism and the percentages of participants who were unconsciously using that specific defense mechanism are provided. The majority of patients were applying idealization (91.3%). On the second and third place, passive aggression (87.0%) and somatization (82.6%) were detected. "Acting out" and "undoing" have been also frequently observed (78.3% for both). The minority of participants were using projection as a defense mechanism (26.1%). Neurotic defense style was the prevalent style used by individuals with SCI with adjustment disorder ( $11.52 \pm 2.26$ ) (Table 2).

Demographic characteristics including sex, marital status, and educational level were not associated with the mean of defense styles (P: 0.38, 0.69 and 0.88, respectively). Furthermore age was not correlated with any of the defense styles (P: 0.57, 0.48 and 0.65 for immature, mature and neurotic styles, respectively). Cause of the injury, Injury level and ASIA score were also not related to defense style (P: 0.73, P: 0.32 and 0.56, respectively) (Table 3). Other injury-related variables such as time since injury, age at the time of injury incidence and SCIM score also had no correlation with defense styles (Table 4). Coincidental occurrence of head injury was not a determinant of used defense style (P: 0.59). Moreover, no relationship between satisfaction with financial status and interpersonal relationships, and defense styles could be detected (P: 0.42 and 0.89, respectively). The discriminating value of suicidal ideation in predicting the used defense style was also insignificant (0.62) (Table 3).

The most commonly observed subtype of AJD was ADJ with depressed mood (n: 11, 47.8%). Other subtypes of AJD were: AJD with anxiety (n: 2, 8.7%), with disturbance conduct (n: 2, 8.7%), with mixed anxiety and depressed mood (n: 6, 26.1%), with mixed disturbance of emotions and conduct (n: 1, 4.3%) and unspecified (n: 1, 4.3%). Subtype of AJD was not associated with use of any specific defense mechanisms (P: 0.09, 0.11, 0.18, 0.20, 0.29, 0.66, 0.16, 0.66, 0.62, 0.57, 0.14, 0.94, 0.97, 0.48, 0.76, 0.88, 0.56, and 0.66 for idealization, undoing, pseudo-altruism, acting out, reaction formation, projection, passive aggression, devaluation, isolation, autistic fantasy, denial, displacement, dissociation, splitting, somatization, sublimation, humor, anticipation and suppression defense mechanisms. Similarly, use of defense styles including immature, mature and neurotic was not related to the subtype of AJD (P: 0.44, 0.93 and 0.06, respectively).

**Table 2 Mean scores of each psychological defense mechanism obtained by Defense Style Questionnaire (DSQ-40)**

	Mean (SD)	Prevalence (Percentage)*
Mature	9.57 (3.09)	
Sublimation	8.35 (9.65)	9 (39.1%)
Humor	9.65 (5.91)	11 (47.8%)
Anticipation	11.65 (3.91)	15 (65.2%)
Suppression	8.61 (3.11)	8 (34.8%)
Neurotic	11.52 (2.26)	
Undoing	11.87 (3.67)	18 (78.3%)
pseudo-altruism	12.87 (3.93)	17 (73.9%)
Idealization	12.57 (4.16)	21.0 (91.3%)
Reaction formation	8.78 (4.23)	12 (52.2%)
Immature	10.58 (1.81)	
Projection	6.30 (3.44)	6 (26.1%)
Passive aggression	12.56 (4.21)	20 (87.0%)
Acting out	12.48 (4.97)	18 (78.3%)
Isolation	9.43 (3.11)	13 (56.5%)
Devaluation	11.17 (3.95)	13 (56.5%)
Autistic fantasy	11.39 (5.22)	15 (65.2%)
Denial	10.00 (3.59)	15 (65.2%)
Displacement	8.96 (3.66)	9 (39.1%)
Dissociation	9.48 (5.20)	12 (52.2%)
Splitting	10.57 (4.25)	16 (69.6%)
Rationalization	11.91 (4.64)	17 (73.9%)
Somatization	12.39 (3.56)	19 (82.6%)

\*Prevalence indicates the number of participants who were unconsciously using that specific defense mechanism (DSQ-40 score > 10 in that specific defense mechanism).

**Table 3** The association between demographic and injury-related variables with used defense styles

Variable		Defense Style expressed by Mean (SD)			P-value*
		Immature	Mature	Neurotic	
Sex	Male	10.77 (1.75)	9.10 (3.09)	11.32 (2.30)	0.38
	Female	9.95 (2.10)	11.25 (2.73)	12.25 (2.17)	
Marital Status	Single	10.18 (1.75)	8.27 (3.32)	10.52 (1.94)	0.69
	Married	10.56 (1.96)	10.86 (2.20)	13.14 (1.92)	
	Widow/widower	12.58	11.75	14.25	
	Divorced before injury	11.71 (2.77)	9.88 (2.29)	9.75 (1.76)	
Educational level	Divorced after injury	10.54 (1.70)	10.75 (5.30)	11.75 (2.47)	0.88
	Primary School	11.42 (2.35)	11.13 (4.06)	12.50 (2.12)	
	Middle School	10.19 (1.25)	8.19 (2.43)	10.75 (4.03)	
	High School	9.94 (1.37)	5.25 (1.95)	13.08 (1.58)	
	Diploma	10.90 (1.79)	10.30 (2.90)	11.68 (1.74)	
Injury Level	Academic Education	10.33 (2.90)	11.56 (1.04)	10.25 (1.67)	0.32
	Cervical	10.86 (1.30)	9.18 (3.40)	12.0 (2.47)	
	Thoracic	10.0 (2.15)	9.63 (3.32)	11.20 (2.20)	
	Lumbar	11.69 (1.74)	10.67 (0.87)	11.00 (2.16)	
Coincidental head injury	Yes	10.82 (1.66)	10.40 (2.87)	11.90 (1.30)	0.59
	No	10.39 (1.99)	8.92 (3.22)	11.23 (2.80)	
Financial Satisfaction	Totally Satisfied	11.30 (1.26)	10.43 (4.14)	12.46 (2.27)	0.42
	Relatively Satisfied	10.19 (2.03)	9.30 (2.63)	10.92 (2.13)	
Satisfaction with interpersonal relationships	Dissatisfied	11.08	7.50	14.00	0.89
	Totally Satisfied	10.54 (1.61)	10.17 (3.00)	12.23 (2.27)	
	Relatively Satisfied	10.77 (2.21)	8.47 (2.89)	10.86 (1.63)	
Movement aids	Dissatisfied	10.08 (2.35)	10.88 (5.12)	10.25 (4.59)	0.79
	Wheelchair	10.68 (1.89)	10.10 (2.77)	11.38 (2.35)	
	Walker	9.75 (1.88)	7.0 (3.88)	11.75 (0.70)	
	Cane	10.33	4.00	14.00	
ASIA score	A	10.97 (1.96)	9.50 (2.59)	11.28 (2.23)	0.56
	B	10.86 (1.15)	10.19 (2.80)	11.53 (2.67)	
	C	9.55 (2.41)	9.80 (4.10)	11.45 (1.74)	
	D	10.33	4.00	14.00	
Cause of the injury	Road accidents	10.39 (1.77)	9.59 (3.16)	12.01 (1.92)	0.73
	Falling	11.13 (1.46)	9.56 (3.71)	11.31 (2.52)	
	Crash under heavy objects	11.04 (3.71)	9.38 (3.0)	7.75 (1.06)	
Suicidal Ideation	Yes	10.95 (2.25)	9.21 (2.75)	10.67 (2.94)	0.62
	No	10.48 (1.73)	9.69 (3.27)	11.82 (1.98)	

ASIA: American Spinal Cord Injury Association; SD: Standard Deviation.

\*P-value stands for comparison of means by *t*-test between two groups. When more than two groups were defines, One-way Analysis of Variance (ANOVA) was used for proper comparison of means.

## Discussion

This study shows that the dominant defense style that is used by individuals with SCI with adjustment disorder is neurotic style. Idealization was the most commonly used

**Table 4** The bivariate correlation analysis to determine the relationship between continuous variables (age, time since injury, age at the time of injury incidence and SCIM score) and defense styles

Variable	Immature Style*	Mature Style*	Neurotic Style*
Age	0.57	0.48	0.65
Time since injury	0.08	0.10	0.35
Age at the time of injury incidence	0.64	0.41	0.62
SCIM score	0.35	0.76	0.86

SCIM: Spinal cord independence measure III.

\*P-values stand for bivariate correlation analysis between variables.

defense mechanism. This is the first study demonstrating the most prevalent defense style used among individuals with SCI. Previously, usage of different defense mechanisms has been shown among different populations. In this regard, Shabanpour *et al.*<sup>32</sup> and Pollock and Andrews<sup>36</sup> showed that patients suffering from obsessive-compulsive disorder (OCD) mostly use immature defense style. It seems that the pathogenesis of OCD differs from those psychological disturbances that occur after SCI. Furthermore, in line with our results, Sammallahti *et al.*<sup>37</sup> reported that “idealization” is commonly used by individuals with SCI who were injured at very young ages. In idealization, there is a tendency toward believing that another person is highly qualified with inability to do wrong.<sup>38</sup> Usage of “idealization” defense mechanism is indicative of dependent identity. In fact, the major characteristic of independent identity is to not consider anyone as saint.<sup>37</sup> Our study in line

with Sammallahti's is suggestive of prevalent usage of "idealization" defense mechanism in SCI. It seems that individuals who are physically dependent to others are more susceptible to develop dependent identity and therefore dominant usage of "idealization" defense mechanism can be expected among this population.

It has been reported by Doruk *et al.*<sup>39</sup> that patients with adjustment disorder use less mature and more immature defenses. In line with findings in Doruk *et al.* investigation, our study also showed that individuals with SCI with AJD use less mature defenses. Our results are in accordance with those studies in patients with suicide attempt<sup>40</sup> and personality disorder.<sup>41</sup> Patients in our study scored high on neurotic defense style whereas Doruk *et al.*<sup>39</sup> demonstrated that neurotic style was similarly used by patients with AJD compared to healthy controls. On the other hand, it has been shown that patients with panic disorder,<sup>42</sup> obsessive compulsive disorder (OCD),<sup>36</sup> anxiety and depressive disorder<sup>43</sup> usually incline to use neurotic style. It can be concluded that co-existence of SCI and AJD affects the use of defense mechanisms so that these defenses differ from patients with only AJD. Our study showed that Iranian patients with SCI and AJD dominantly use neurotic defense style that is more similar to individuals with panic disorder and OCD.

"Mature" defense style was the rarest style used by people with SCI and AJD in this study. It has been demonstrated that usage of mature defenses is closely correlated with Ego maturity. In fact mature defense style has a protective effect against psychopathological disorders.<sup>44</sup> Less usage of "mature" style has already been shown among people with anxiety disorders.<sup>45,46</sup> Similar to results among patients anxiety disorder, our study also showed low level of usage of "mature" styles among people with co-existence of SCI and AJD. Less usage of "sublimation" in our study population is similar to the results in patients with OCD,<sup>31</sup> which indicates the probability of development of obsessive compulsive components after SCI. Previously, minor self-mutilating actions, such as nail biting and hair pulling, which are known to be associated with obsessive-compulsive personality traits, has been observed in SCI.<sup>47</sup> Our study invigorates the hypothesis of existence of obsessive compulsive components in SCI which was proposed by Frost *et al.*<sup>47</sup>

The second most commonly used defense mechanism was "passive aggression." Previously, Sammallahti *et al.*<sup>37</sup> showed adults with pediatric SCI tend to convey aggressions by a psychological paralysis and higher scores in "passive aggression" defense mechanism

have been observed. Here, we report the similar results among adults with SCI who were also suffering from AJD. As Sammallahti explained, the reason for high usage of a "passive aggressive" defense mechanism can be justified by dependent position of affected individuals which fosters indirect means of expressing needs and subsequently, a shift from active to passive defensive strategy.

Our findings showed no significant effect of demographic characteristics (age, marital status, sex, educational level) and injury-related variables (time since injury, injury level, ASIA score, SCIM score, and cause of the injury) on the usage of defense mechanisms. Similarly, Sammallahti *et al.*<sup>37</sup> showed that the role of time since injury in determining used defense style was insignificant. Here, we report the similar results. However, due to limited number of participants in our study, further investigations are required to clarify the role of demographic and injury-related variables as determinants of used defense mechanisms. It has been described by Carolyn<sup>48</sup> that immature defenses are mostly used during childhood and youth whereas adolescents tend to use "mature" defense styles. Participants in our study had relatively similar age range and were mostly young. Therefore, one reason for the rare usage of "mature" defense style in our study population can be traced back in young ages of participants.

Bond and Perry<sup>49</sup> showed that individuals' physical and mental health is closely related to the used defense mechanisms. Therefore, identification of these defense mechanisms and styles has great importance in the process of prevention, diagnosis and treatment. Interventions which help individuals to use favorable defense mechanisms can increase adaptability.<sup>50</sup> When a defense mechanism is persistently used, it can become pathological and causes psychological disturbances.<sup>38</sup> In fact, individuals use defense mechanism to modify the reality and to maintain coping abilities. Thus, more defense mechanisms are used through time to maintain being calm and stable, which decreases one's coping and problem solving ability. In another word, a defense mechanism itself can be a source of mental tension so the importance of identification and modification of defense mechanisms used in a specific population is obvious.

The pattern of use of psychological defense mechanisms in general population of Iran has not yet been fully described. In this regard Shabanpour *et al.*,<sup>32</sup> recruited 116 normal individuals from healthy population of Iran to assess defense mechanisms. Results of Shabanpour *et al.* study has demonstrated that mature

defense style especially sublimation and anticipation defense mechanisms are dominantly used by healthy individuals. Here, we did not assign a control group to assess defense mechanisms in general population. However, comparison of our outcomes with results published on general population of Iran by Shabanpour *et al.* shows that people with SCI and AJD tend to use more immature defenses than healthy individuals.

Another important finding of the present study is the high prevalence of AJD among people with SCI (28%). Adjustment disorders are considered as stress related disorders. The prevalence of depressed mood among Iranian population with SCI has been estimated to be about 33%. However, no evidences on the prevalence of adjustment disorder among this population have been reported. Previously, Despland *et al.*<sup>17</sup> showed that AJD can be found among 5–20% of outpatients whereas it is estimated that more than 20% of inpatients have AJD.<sup>16</sup> According to our investigation, although people with SCI are considered as outpatients, the prevalence of AJD in SCI population is closer to estimations among inpatients. There are limited studies estimating the prevalence of AJD in Iran. In this regard, Palahang *et al.*<sup>51</sup> has reported the prevalence of AJD in Kashan city in Iran to be about 1.62% which is much lower than the prevalence of AJD among patients with SCI in our study population. The higher prevalence of AJD among Iranian individuals with SCI compared to general population emphasizes on the necessity of considering therapeutic interventions for those patients susceptible to AJD in order to gain better rehabilitation outcomes. The most common subtype of AJD was ADJ with depressed mood in our study. This finding illustrates that progression of AJD to depression should be considered and proper treatments should be planned for those patients who are prone to AJD progression. According to the diagnostic criteria of DSM-V, symptoms such as low mood, loss of motivation and reduced enjoyment dominate the clinical picture of those patients with AJD with depressed mood. Moreover, existence of other comorbid psychiatric disorders such as anxiety disorders and post-traumatic stress disorder (PTSD) may affect the prognosis of AJD. In this regard Dobricki *et al.*<sup>52</sup> reported that PTSD exists in about 53–70% of people with AJD among refugees in Ethiopia, Algeria, Gaza and Cambodia. In fact, Dobricki *et al.*'s study indicates that both adjustment disorder and PTSD constitute a continuum of a stress-response.<sup>52</sup> Although no clear correlation exists between AJD and mortality, there are some researches suggesting that patients with AJD are at increased risk for morbidity and mortality. For instance, it has been demonstrated by Gradus *et al.*<sup>53</sup>

that people diagnosed with AJD have a 12-fold higher rate of suicide than those without AJD. These findings insist on the necessity of diagnosing AJD among susceptible patients dealing with overwhelming stressors (e.g. in SCI) to prevent mortal consequences of AJD.

The findings of this study show that mature defense style has rarely been used among SCI patients with adjustment disorder, which shows that these individuals require proper interventions to improve coping strategies. There are limited studies evaluating the role of different psychological interventions in improvement of coping strategies in patients with AJD. In this regard, Kramer *et al.*<sup>54</sup> has tested the effect of short-term dynamic psychotherapy on psychological defense mechanisms and coping behaviors in patients with adjustment disorder. Results from Kramer *et al.* study has demonstrated that short-term dynamic psychotherapy (STDP) have significant effect of defense mechanisms and has the potential to change the overall defensive functioning in patients with AJD. It is recommended that future clinical trials evaluate the effect of psychological interventions such as STDP in modulation of defensive profile and coping strategies in patients with SCI and AJD. Our results show that the majority of patients with AJD and SCI use neurotic defense style which is a maladaptive coping behavior. This dominance of using maladaptive coping behaviors requires attention. Previously, Teimourpour *et al.*<sup>55</sup> showed that adjustment to a medical condition is positively correlated to ego-strength. In fact, it can be concluded from Teimourpour *et al.* study that lower ego-strength can be associated with impairments in adjustment process. Therefore, it is essential to improve ego-strength to overcome adjustment disorder. Since psychological defense mechanisms are known to be derived from ego, modulation of defenses toward favorable mature and adaptive coping behaviors can lead to improvement of ego-strength which itself has the potential to improve AJD. Further studies are required to examine the effect of various psychological interventions on modulation of defense mechanisms in patients with AJD.

## Conclusion

The present study has estimated the prevalence of AJD among people with SCI and furthermore, the commonly used defense mechanisms among these patients have been discussed. About 28% of the participants in the initial sample had AJD. Neurotic defense style was the dominant used style among individuals with SCI with AJD. The majority of patients were applying idealization (91.3%). On the second and third place, passive aggression (87.0%) and somatization (82.6%) were

detected. The role of demographic and injury-related variables in determining the used defense mechanisms were insignificant.

### Study limitations

The general population has not been investigated in our study since no control group has been assigned. Further investigations are required to compare the used psychological defense mechanisms between general population and patients with coincidental SCI and AJD. Moreover, the prevalence of AJD reported in this study is not generalizable to other SCI populations (especially those with acute SCI) because the data have been obtained from a tertiary rehabilitation center.

### Acknowledgments

We would like to thank Maryam Nejati Ghavam, Fariba Naemirad and Jayran Zebardast for their contribution in the process of data collection.

### Disclaimer statements

**Contributors** None.

**Conflict of interest** None declared.

**Ethics approval** None

**Funding** This research has been supported by Tehran University of Medical Sciences & Health Services grant no. 23397. No external sponsor exists.

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